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DEVELOPMENT OF THE SOVIET FERROALLOY INDUSTRY

/Numbers in parentheses refer to appended list of sources./

Beginning in 1931, the Soviet ferroalloy industry grew by leaps and bounds. With 1931 production taken as 100 percent, 1933 production was 460 percent; 1937, 3,700 percent; and 1946, 5,600 percent. The Zaporozh'ye Plant before the war had approximately a 90,000-kilovolt-ampere capacity, and supplied ferrosilicon and ferrochrome to all southern plants. The loss of production from the Zaporozh'ye Plant during the war has been made up fully by the completion of the Aktyubinsk and Kuznetsk plants and the increased productivity of the other plants in the East.(1)

In 1950, the production of ferroalloys is scheduled to be 80 percent higher than it was in 1945. The major increase in the smelting of ferroalloys will be attained after completion of the Zaporozh'ye and Lipetsk ferroalloy plants now undergoing reconstruction, as well as by the more effective utilization of the capacities of existing plants. The Zaporozh'ye Plant will have been restored to full capacity by the end of the current Five-Year Plan, it will be considerably better than the old plant and will be able to operate on the basis of all the contemporary achievements of electrometallurgy. The Lipetsk Plant is being rebuilt according to the prewar plan for its development. It will have a new furnace for production of ferrosilicon and will utilize waste gases of this furnace as fuel for production and community needs. The production of rare alloys and complex deoxidizers will be organized at this plant.

Construction of the Aktyubinsk and Kuznetsk ferroalloy plants and considerable expansion of production at the Chusovoy Plant have been planned during the Five-Year Plan. New furnaces will be built at the Klyuchevskiy Ferroalloy Plant and its production will be sharply expanded.

The development of machine building and the demand for high-quality steels requires the ferroalloy industry to start production of new alloys, particularly silicozircon and ferroboron, and to make a substantial increase in output of silicocalcium, nitrited ferrochrome, and a number of complex deoxidizers. A new shop for production of electrolytic manganese will be built at the Zestafoni Ferroalloy Plant.

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One of the first tasks for the industry is to improve the quality of raw materials and the methods for shipping and storing these materials at plants. For many years, the ferroalloy industry has been obtaining for reduction processes ungraded coke fines, and sometimes even coke residue, instead of 15- to 20-millimeter graded coke fines. As a result, the ferroalloy plants have had a considerably higher power consumption per unit of production than if they had had normal supplies of graded coke fines.

The Chelyabinsk and Kuznetsk plants must be supplied with good-quality quartzite. The quality of the Bakal quartzites can be considered sufficiently high, but the mining of them at present is not efficiently organized and a crushing and screening plant is needed. For this reason, the Chelyabinsk Plant has been getting quartzites which contain up to 30 percent fines not suitable for production.

Of particular urgency is the problem of supplying quartzite to the Kuznetsk Plant which at present is operating on Chugunash (Kemerovo Oblast) quartzites of very low quality. Consumption of power in working with these quartzites is 600-800 kilowatt-hours higher per ton of 45 percent ferrosilicon than in working with good-quality Antonovskiy quartzites. Necessary quantities of the latter should be supplied regularly to the Kuznetsk Plant.

Another equally important task is the classification of Aktyubinsk chromite ores and improvement in their shipment. Aktyubinsk ores range in silica content from 5 to 12 percent and in chrome oxides from 45 to 62 percent. However, the different quality ores are mined unsystematically and their shipment by type has not been organized. This situation causes additional difficulties in the production of ferrochrome and lowers the potential recovery of chrome from these ores.

There should also be a further sharp improvement in the preparation of Chiatura manganese ores used by the Zestafoni Plant. The latter receives ore varying widely in manganese concentrates and having a high silica content, each surplus fraction of which leads to an unnecessary loss of as high as 4 percent manganese in the slag. The decrease of silica in the ore to 2-3 percent has helped to achieve a considerable increase in the conversion of manganese without the use of a flux and to improve other technical indexes of production.

There are large-scale plans afoot for rebuilding large ferroalloy furnaces with a view toward improving their capacity and simplifying the structure of the electrode holders. This will make it possible to smelt successfully such alloys as silicocalcium and silicochrome by the slag method and, in the smelting of siliceous alloys, to simplify and facilitate to a considerable extent servicing of the furnaces, as well as to increase labor productivity by 25-30 percent.

The industry producing refined ferrochrome has the task of increasing the chrome recovery up to 90 percent and decreasing sharply the consumption of the reducing agent. This project will be realized by the gradual substitution of inclined furnaces for stationary furnaces and by organization of the recovery of metallic regulus from the slags, as well as by striving to combat other types of loss. There also should be a substantial improvement in the quality of the lime used as a flux.

The considerable volume of slags formed at ferroalloy plants have remained almost unused until now. They should be used in the production of cement and in construction of highways.

There should also be a gradual trend toward uniformity of equipment, making it possible by the end of the Five-Year Plan to set up a centralized machine and electrical repair base and to cut down on expenditures for current and capital repairs. This will eliminate the extraordinary condition now prevailing where 40-50 percent of the ferroalloy plants' workers are repair men.(2)

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In connection with the increased needs of machine building for steels with a higher content of phosphorus, the smelting of phosphoritic alloys in blast furnaces has been started. For example, production of ferrophosphorus has been started in one of the small (114-cubic-meter volume) blast furnaces in the Urals, as well as low-carbon ferromanganesephosphorus, a small quantity of which has been made experimentally in the same furnace.(3)

SOURCES

1. Stal', Vol VII, No 11, Nov 47

2. Stal', Vol VII, No 10, Oct 47

3. Stal', Vol VII, No 4, Apr 47

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